

A.2.16 SWMU 35**Description**

SWMU 35 is the location of the former No. 4 Separator surface impoundment as depicted on Figure A.2.13. According to the DOCC (ESE, 1994), wastes managed in the area included water separator sludge, process sludge, and storm water. The area is located between Tanks 330 and 327 in the North Field. Pre-RFI soil sampling conducted by DRAI confirmed that soils at the location of boring B-21 contained VOCs and metals at concentrations above the 1st-Phase RFI Action Levels.

As summarized on Table A.2.13, nine borings, 14 soil samples, one monitoring well groundwater sample and two hydropunch samples have been used to characterize this SWMU. Three borings, including the two hydropunch samples, were installed during the 1st-Phase RFI. No soil samples were collected and submitted for laboratory analyses. During the Full RFI, 14 soil samples were collected from six borings to characterize this SWMU. Twelve of the 14 soil samples collected were analyzed for TCL VOCs and SVOCs, and TAL metals. During the Full RFI second iteration sampling, two soil samples were analyzed for BTEX, PAHs, arsenic and copper. One sample was also analyzed for SPLP metals and physical characteristics.¹

Soils

The following table summarizes the number of samples where soil delineation criteria were exceeded within SWMU 35:

Constituents of Concern	Surface Soils (0 to 2 ft) (4 Samples)	Fill Material (>2 ft) (6 Samples)	Native Soils (4 Samples)	Totals (14 Samples)
Benzene	0/4	3/6	0/4	3/14
Other VOCs	0/4	1/6	0/4	1/14
Benzo(a)pyrene	0/4	4/6	0/4	4/14
Other SVOCs	0/4	5/6	0/4	5/14
Lead	0/4	2/4	0/4	2/12
Arsenic	0/4	2/6	0/4	2/14
Copper	0/4	1/6	0/4	1/14

Surface Soils (0 to 2 feet bgs)

Staining was noted in only one boring in the zero to two foot depth range at SWMU 35. Aside from naturally-occurring iron, the four surface soil samples did not contain any VOCs, SVOCs or metals in excess of the soil delineation criteria.

¹Physical characteristics specified in Appendix A, Task IV of Module III of the HWSA Permit included saturated and unsaturated permeability tests, moisture content, relative permeability, bulk density, porosity, soil sorptive capacity, CEC, TOC, pH, Eh and grain size distribution.

Fill Materials (>2 feet bgs)

The lithologic descriptions on the boring logs indicate that visual evidence of petroleum impacts (e.g., petroleum staining, odors, PID readings greater than 100 ppm, etc.) in the fill material was noted frequently. These impacts are consistent with the sludges that would have been deposited within SWMU 35 as part of historical operations. The fill layer within SWMU 35 is uniform, ranging in thickness from approximately eight feet (S0790) to 12 feet (S0788 and S1024).

As shown on the Table A.2.13, benzene was detected in excess of the delineation criteria at three locations: S1023C3 (1.5 mg/kg), S0788F3 (1.9 mg/kg), and S0789F3 (9.4 mg/kg). Benzo(a)pyrene and/or several other PAHs were detected above the applicable soil delineation criteria in five of the six subsurface fill samples (greater than two feet bgs). Benzene and/or benzo(a)pyrene were detected in all but one of the samples where exceedances of other COCs were observed. S0790B2 was the only sample where benzo(a)anthracene (1.87J mg/kg) was the only COC detected above the delineation criteria. Arsenic (48.3 and 44.2 mg/kg) and lead (470 and 502 mg/kg) were detected above the soil delineation criteria within two subsurface fill samples (S0788F3 and S0789F3, respectively) at 11 to 12 feet bgs. Arsenic (48.3 and 42.2 mg/kg) is well within the normal range for soils, particularly glauconitic soils in the Coastal Plain (Saunders, 2003). Copper (1,020 mg/kg) was also detected above the applicable soil delineation criteria in the S0789F3 sample.

Native Material

A clay/peat layer with a sand and/or meadow mat component underlies the fill material in this part of the Refinery at depths ranging from eight to 12 feet bgs. No VOCs, SVOCs or metals (except for naturally-occurring iron) were detected above the applicable soil delineation criteria within the native soil at SWMU 35. As discussed previously, sample S0789F3, which was collected closest to the top of the native unit, did contain exceedances of VOCs, SVOCs and metals. However, no exceedances were detected in the sample collected below and fully within the native material (S0789I4). Therefore, the site-related soil impacts have been delineated vertically.

As discussed further in Section 6 of the RFI Report, lateral delineation of selected COCs has been completed on a site-wide basis for each Yard. The delineation of these COCs is depicted graphically on the figures provided in Section 6.

Groundwater

Benzene (290 µg/L), arsenic (20 µg/L) and unknown TICs (greater than 100 µg/L) were detected above the groundwater delineation criteria in 2002 from a monitoring well sample collected from MW-122 within SWMU 35. Benzene and other COCs in excess of the delineation criteria were detected in two samples collected from hydropunch locations HP-0001 and HP-0002A in 1995. It appears that activities conducted within

SWMU 35 may have impacted groundwater. Further discussion of groundwater impacts can be found in Section 8 of the RFI Report.

Summary

Several COCs, including but not limited to, benzene, benzo(a)pyrene and lead were detected at concentrations above their respective soil delineation criteria at SWMU 35 in soil/fill at depths greater than two feet bgs. The impacts are found almost entirely within the fill layer, which also exhibits widespread evidence of stained soils and petroleum-related impacts, which is likely representative of former materials and wastes managed in the area. As no COC exceedances were found in the underlying native material, the site-related soil impacts are limited to the fill and have been delineated vertically. Institutional controls and/or an engineered barrier for site-related impacted soils from the fill unit within SWMU 35 will be considered in the CMS.

COCs have also been detected above the applicable groundwater delineation criteria in groundwater samples from within and SWMU 35. Potential groundwater impacts from SWMU 35 will also be included in the CMS as part of the site-wide groundwater evaluation.